

## PROJECT DESCRIPTION

## I. General

This project involves the installation of a new traffic control signal with pedestrian indication and actuation, traffic signal interconnect, and pre-emption for light rail at the intersection of Elm Road and Fuel Farm Road in Anne Arundel County. Elm Road is assumed to run in a north/south direction.

## II. Intersection Operation

This intersection is proposed to operate in a fully-actuated mode with Southbound Elm Road left turn lane operating in an exclusive phase. Northbound and southbound Elm Road shall operate concurrently. Eastbound and westbound Fuel Farm Road shall also operate concurrently. A pedestrian phase shall allow pedestrians to cross the south leg of Elm Road. During pre-emption, northbound and southbound Elm Road shall operate concurrently.

## III. Special Notes

1. The contact persons for District # 5 are as follows:

Mr. Paul Armstrong  
District Engineer  
Phone # (410) 841-5450

Mr. Lawrence Elliott  
Asst. District Engineer -  
Traffic  
Phone # (410) 841-5450

Mr. Raymond Hutzler  
Asst. District Engineer  
Maint.  
Phone # (410) 841-5450

Mr. John Mays  
Asst. District Engineer  
Utility  
Phone # (410) 841-5450

Mr. Richard L. Daff, Sr.  
Chief, Traffic Operation Division  
Phone # (410) 787-7630

2. The contractor shall use the following standard plates for maintenance of traffic: 105.00, 105.01, 105.02, 105.03, 105.102, 105.104, 105.106, 105.108, 105.110, 105.202, 105.204, 105.206, 105.208, 105.210, 105.212.

## EQUIPMENT LIST

## A1. Equipment to be supplied by the State Highway Administration

Item No.	Quantity	Units	Specification Section	Description
1	EA	814	8 in. 1 way 3 section (RA,YA,GA) signal head - mast arm mount.	
1	EA	814	12 in. 1 way 3 section (RA,YA,GA) signal head - mast arm mount.	
2	EA	814	12 in. 1 way 3 section (R,Y,G.) optically programed signal head - mast arm mount.	
8	EA	814	12 in. 1 way 3 section (R,Y,G.) signal head - mast arm mount.	
2	EA	814	12 in. 1 way 1 section (Y) signal head - pole mount.	
1	EA	814	12 in. one-way 2 section pedestrian signal head pole mount	
1	EA	814	12 in. one-way 2 section pedestrian signal head - pole mount	
3	EA	816	Eight-phase (fully actuated controller and cabinet) - base mount	
2	EA	817	Pedestrian pushbutton and R10-3c sign	
10	EA	xxx	Two channel loop detector amplifier (delayed output)	
94	SF	813	Sheet aluminum signs consisting of:	
2	EA	D3-2 (var x 16 in.) "Elm RD." sign mast arm mount		
1	EA	R3-5 (L) (30" x 36") mast arm mount		
1	EA	R3-5(R) (30" x 36") mast arm mount		
3	EA	R4-7 (24" x 30") ground mount		
2	EA	R10-6b (24" x 30") ground mount		
2	EA	R10-3c (9" x 12") pole mount		
2	EA	W3-3 (36" x 36") ground mount		

## EQUIPMENT LIST (CONT.)

## A1. Equipment to be supplied by the State Highway Administration

Item No.	Quantity	Units	Specification Section	Description
1	EA	W10-3 modified (30" x 30") ground mount		
1	EA	Special sign, "TRAIN CROSSING ON RIGHT" (20" x 52") ground mount		
1	EA	Special Sign, "WHEN FLASHING" (10" x 72") ground mount		

## EQUIPMENT LIST

## A2. Equipment to be supplied by the Mass Transit Administration

Item No.	Quantity	Units	Specification Section	Description
2	EA	xxx	Light Rail Vehicle Signal Head - Pedestal mount	

## EQUIPMENT LIST

## B. Equipment to be furnished and/or installed by the Contractor.

Item No.	Quantity	Units	Specification Section	Description
1	LS	104		Maintenance of traffic
5	EA	205		Test pit excavation
180	LF	555		Furnish and install 24 in. white permanent preformed pavement marking tape
180	LF	555		Furnish and install 12 in. white permanent preformed pavement marking tape
15.5	CY	801		Furnish and install concrete for signal foundation.
5	EA	804		Furnish and install ground rod - 3/4 in. diameter x 10 ft.
70	LF	805		Furnish and install 4 in. schedule 40 rigid PVC conduit - Trenched.
80	LF	805		Furnish and install 2 in. schedule 40 rigid PVC conduit - encased in conc.
40	LF	805		Furnish and install 3 in. schedule 80 rigid PVC conduit - pushed
1580	LF	805		Furnish and install 2 in. schedule 40 rigid PVC conduit - Trenched.
50	LF	805		Furnish and install 1 in. liquid tight flexible non-metallic conduit for detector wire sleeve.
250	LF	805		Furnish and install 4 in. schedule 80 rigid PVC conduit pushed.
280	LF	805		Furnish and install 2 in. schedule 80 rigid PVC conduit pushed.
1	EA	807		Furnish and install control and distribution equipment.
440	LF	810		Furnish and install No. 6 AWG standard bare copper ground wire.
540	LF	810		Furnish and install electrical cable 1- conductor No. 4 AWG - THHN/THWN
2750	LF	810		Furnish and install electrical cable - 2 conductor (Aluminum shielded).
3200	LF	810		Furnish and install electrical cable - 5 conductor (No. 14 AWG).
3400	LF	810		Furnish and install electrical cable - 7 conductor (No. 14 AWG).
2490	LF	810		Furnish and install loop wire encased in flexible tubing (No. 14 AWG).

**DCI**  
CONSULTING ENGINEERS  
COLUMBIA, MARYLAND

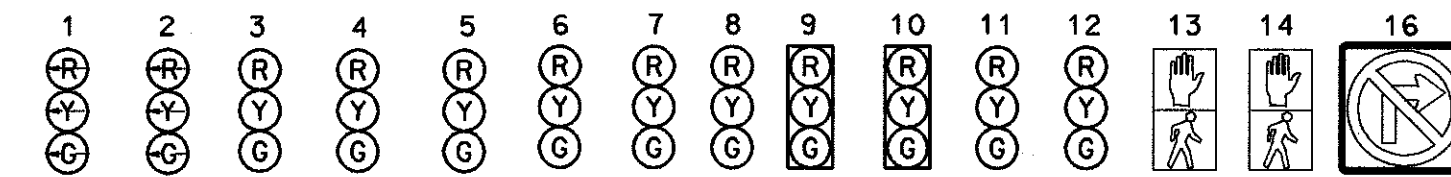
## EQUIPMENT LIST (CONT.)

## B. Equipment to be furnished and/or installed by the Contractor.

Item No.	Quantity	Units	Specification Section	Description
16	EA	811		Furnish and install electrical handhole.
36	SF	813		Install overhead sign for signals.
58	SF	813		Install ground mounted sign
18	EA	814		Install signal head - any type
1	EA	xxx		Furnish and install internally illuminated sign
660	LF	815		Furnish and install saw cut for signal.
1	EA	816		Install eight phase (fully actuated) controller and cabinet - base mount.
1	EA	SP		Furnish and install a 21 ft. steel pole with a 50 ft. mast arm (Note: Four - 1 3/4 in. x 90 in. anchor bolts).
1	EA	829		Furnish and install 21 ft. steel pole with twin 70 ft. and 38 ft. mast arms (Note: Four - 2 in. x 90 in. anchor bolts).
1	EA	SP		Furnish and install a 21 ft. steel pole with a 70 ft. mast arm (Note: Four - 2 in. x 90 in. anchor bolts).
1	EA	822		Use existing disk and as-build traffic control signal
1	EA	SP		Furnish and install 10 ft. breakaway pedestal pole
3	EA	SP		Furnish and install 14 ft. breakaway pedestal pole
4	EA	xxx		Furnish and install breakaway based support system.
2	EA	xxx		Install pushbutton and sign.

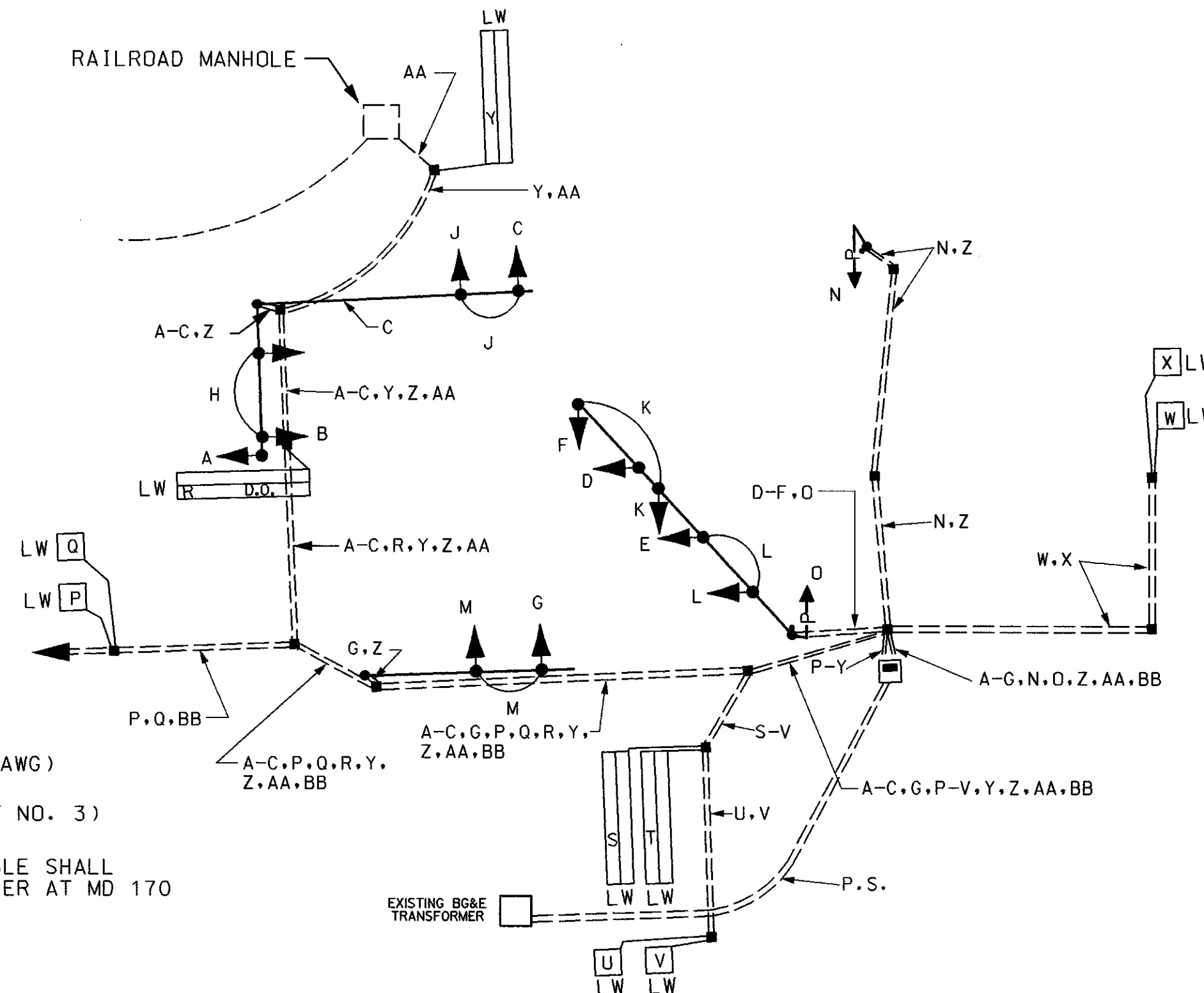
**WIRING KEY**  
A-G - 7 CONDUCTOR ELECTRICAL CABLE (NO. 14 AWG) FOR VEHICLE SIGNAL HEAD  
H,J-M - 5 CONDUCTOR ELECTRICAL CABLE (NO. 14 AWG) FOR VEHICLE SIGNAL HEAD  
N,O - 5 CONDUCTOR ELECTRICAL CABLE (NO. 14 AWG) FOR PEDESTRIAN SIGNAL HEAD AND PUSHBUTTON  
P-Y - 2 CONDUCTOR ELECTRICAL CABLE (NO. 14 AWG) ALUMINUM SHIELDED FOR LOOP DETECTOR  
Z - 1 CONDUCTOR STRANDED BARE COPPER WIRE (NO. 6 AWG)  
AA - 5 CONDUCTOR ELECTRICAL CABLE (NO. 14 AWG) INSTALL TO LRV SIGNAL SITE NO. 3 (SEE SHEET NO. 3)  
BB - 7 CONDUCTOR ELECTRICAL CABLE (NO. 14 AWG) FOR TRAFFIC SIGNAL HASEWIRE INTERCONNECT CABLE SHALL BE INSTALLED TO THE TRAFFIC SIGNAL CONTROLLER AT MD 170 AND ELM ROAD  
LW - LOOP WIRE  
PS - PROPOSED POWER SERVICE

## PHASING SEQUENCE CHART



Phase 1 & 6	-G-	-G-	G	G	R	R	R	R	R	R	R	R	R	R	R	DW	DW	DARK	
1 & 6 Change	-Y-	-Y-	G	G	G	G	R	R	R	R	R	R	R	R	R	DW	DW	DARK	
Phase 2 & 6	R	R	G	G	G	G	R	R	R	R	R	R	R	R	R	DW	DW	DARK	
2 & 6 Change	R	R	Y	Y	Y	Y	R	R	R	R	R	R	R	R	R	DW	DW	DARK	
Phase 4 & 8	R	R	R	R	R	R	G	G	G	G	G	G	G	G	G	DW	DW	DARK	
4 & 8 Change	R	R	R	R	R	R	Y	Y	Y	Y	Y	Y	Y	Y	Y	DW	DW	DARK	
Phase 4 ALT	R	R	R	R	R	R	R	R	R	R	R	R	R	G	G	FL DW	FL DW	DARK	
Ped Clear	R	R	R	R	R	R	R	R	R	R	R	R	R	G	G	FL DW	FL DW	DARK	
4 Change	R	R	R	R	R	R	R	R	R	R	R	R	R	Y	Y	DW	DW	DARK	
PRE-EMPT 1	R	R	G	G	G	G	R	R	R	R	R	R	R	R	R	DW	DW		SIGN ON
PRE-EMPT 1 CHANGE	R	R	Y	Y	Y	Y	R	R	R	R	R	R	R	R	R	DW	DW		
Flashing Operation	FL R	FL R	FL Y	FL Y	FL Y	FL Y	FL R	FL R	FL R	FL R	FL R	FL R	FL R	FL R	FL R	DARK	DARK	DARK	

## WIRING DIAGRAM



## MARYLAND DOT - STATE HIGHWAY ADMINISTRATION

## Office of Traffic &amp; Safety

## TRAFFIC ENGINEERING DESIGN DIVISION

ORIGINAL DRAWN BY	S. CHERNACK/ROB CICCHINI	ELM ROAD AT FUEL FARM RD GENERAL INFORMATION SHEET			
DES. BY	S. CHERNACK/D. PETERS				
CHK. BY					
LOG MILE:		COUNTY:		ANNE ARUNDEL	
DATE:	AUGUST 1996	F.A.P. NO.	TS/FILE NO.		SHEET NO.
SCALE:	NTS	S.H.A. NO.			4 OF 5